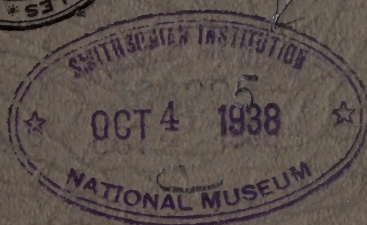
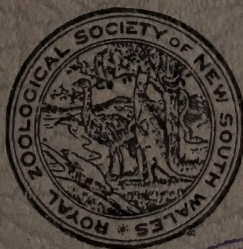


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PROCEEDINGS
OF THE
ROYAL ZOOLOGICAL
SOCIETY
OF
NEW SOUTH WALES
FOR THE YEAR
1937-8



AUGUST, 1938.

SYDNEY:

Published by the Society, 28 Martin Place.

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ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

(Established 1879.)

Registered under the Companies Act, 1899 (1917).

PATRONS:

His Excellency the Lieutenant-Governor, Sir Philip Street, K.C.M.G.
Sir Philip Woolcott Game, G.B.E., K.C.B., D.S.O.

COUNCIL, 1938-1939.

President: A. F. Basset Hull, M.B.E., F.R.Z.S.

Vice-Presidents: Theodore Cleveland Roughley, B.Sc., F.R.Z.S.; Neville W. Cayley, F.R.Z.S.; Garnet Halloran, B.Sc., M.D., F.R.A.C.S., F.R.C.S. (Ed.); and Frank Marshall, C.M.G., D.D.S.

Honorary Secretary: Tom Iredale.

Honorary Treasurer: Phillip Shipway.

Honorary Librarian: A. S. Le Souef, C.M.Z.S.

Members: E. J. Bryce, F.R.G.S.; Clive W. Firth; W. B. Gurney; Aubrey Halloran, B.A., LL.B.; Keith A. Hindwood; Charles F. Laseron; Albert Littlejohn; Noel L. Roberts; Michael S. R. Sharland; Gilbert Percy Whitley, F.R.Z.S.

Assistant Honorary Secretary: Betty French.

Honorary Auditor: R. J. Stiffe, A.C.A. (Aust.).

OFFICERS OF SECTIONS.

Avicultural Section.

Chairman: A. H. Brain.

Hon. Secretary: L. E. Deane.

Budgerigar Section.

Chairman: R. J. Murray.

Hon. Secretary: F. Brennan.

Marine Zoological Section.

Chairman: Miss Joyce K. Allan.

Hon. Secretary: Miss M. Golding.

Ornithological Section.

Chairman: M. S. R. Sharland.

Hon. Secretary: Roy Cooper.

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

The Annual General Meeting of the Society was held at Taronga Zoological Park, Mosman, on Saturday, 23rd July, 1938, at 3 p.m. One hundred and twenty-five members and visitors were present. The Honorary Secretary (Mr. A. F. Basset Hull) read the :

FIFTY-EIGHTH ANNUAL REPORT.

MEMBERS.

On 30th June, 1938, there were 492 members on the register, divided into the various categories as follows : Associate benefactors, 3 ; life members, 29 ; ordinary members, 272 ; honorary members, 8 ; honorary associates, 2 ; life associates, 24 ; associates, 154. Eleven members died during the year, 19 resigned, and the names of 55 were removed from the register under Article 9. The net reduction in the number of members, as compared with the previous year, was 81. This may appear to constitute a heavy loss, but it was largely caused by the dropping out of many associates who had joined in the anticipation of deriving benefit from trading in birds for aviary purposes. The Council, two years ago, decided that no encouragement would be given to any commercial transactions of the kind.

THE COUNCIL.

Eleven meetings of Council were held during the year, the average attendance at which was 11.7. Mr. E. F. Pollock, who had been a member of Council since 1923, resigned owing to ill-health, and Mr. C. F. Laseron was elected to fill the vacancy.

HONOUR TO MEMBER.

By a regrettable oversight, last year's report omitted to mention the honour of Officer of the Order of the British Empire (O.B.E.) conferred upon Mr. Harry Burrell, the well-known authority on the habits of the platypus.

LOSS OF PROMINENT MEMBERS.

Amongst those who died during the year were Mr. F. P. Dodd, honorary associate, whose beautiful collection of Australian insects was widely exhibited throughout the eastern States, and formed one of the attractions offered to tourists at his late residence, Kuranda, North Queensland ; Colonel E. A. Le Souef, formerly Director of the Zoological Gardens, Perth, Western Australia ; Mr. C. W. D. Conacher, a life member ; Dr. F. G. Hardwick and Mr. A. E. P. West, life associates.

NEW ROOMS.

On 1st July, 1937, the Society moved to larger rooms on the sixth floor of 28 Martin Place, which were extensively renovated, and 60 theatre chairs installed, thus providing greater space and better comfort for members attending the meetings.

FINANCES.

Owing to the change of room, increased rental, and elaborate furnishing, the year's expenditure for the first time exceeded the revenue. It is a matter of congratulation that this state of affairs was unique in the history of the Society, and as the cost of furnishing is not a recurrent one, we can confidently expect that it will not occur again.

PUBLICATIONS.

In addition to the *Proceedings* published in August, 1937, Part 1 of Volume 9 of *The Australian Zoologist* was issued on 12th November, 1937. There has been a steady demand for the late Allan McCulloch's *Fishes and Fish-like Animals of New South Wales*, and the third edition is now nearly sold out. Consideration is being given to the preparation of a new and more comprehensive Handbook to the Fishes of Australia.

HANDBOOK FUND.

The invested amount of this fund now stands at a little over £2,000. An advance from the current bank balance was made to the General Account temporarily, but this will be adjusted during the current year.

SECTIONS.

Each Section reports commendable activity on the part of its officers and members, and reports covering their work for the year will be duly published in the *Proceedings* of the Society.

PRESERVATION OF THE TASMANIAN "TIGER".

Correspondence with the Tasmanian authorities has been carried on, and copies of full reports of expeditions in search of this fast disappearing marsupial have been received from the Tasmanian Fauna Board. From these it appears probable that in the remote and almost unexplored portions of the north-west and south-west areas there are still several survivals. Further expeditions are planned for the coming spring, and a cordial invitation has been extended by the Board to a member of this Society to accompany the next expedition, when he will be the guest of the Board.

TARONGA PARK TRUST.

The Trustees continue to provide special facilities for members of this Society in accordance with the original agreement under which our members have free admission to the Park and Aquarium. This privilege should attract more new members in view of the increasing attractions of the Park.

AUSTRALIA'S 150TH ANNIVERSARY.

This Society organized an Exhibition of Australian Fauna and Flora as part of the Anniversary Celebrations. Cordial cooperation was accorded by the Government Departments of Agriculture, Mines and Forests, the Australian Museum, the Royal and Linnean Societies of New South Wales, Taronga Park Trust, The University, Sydney, the Wild Life Preservation Society and the Naturalists' Society of New South Wales, the Rangers' and Forest Leagues, and the Federation of Bush Walkers. The Curator of the Technological Museum and the Royal Australian Historical Society assisted by lending cases for exhibits and in other ways. The Celebrations Council provided the necessary space for the Exhibition in the basement of the Commonwealth Bank, together with lighting and other facilities. The Exhibition was formally declared open by the Honourable D. H. Drummond, Minister for Education, on 8th March, 1937, and it remained open to the public, free of charge, until the 19th idem. About 10,000 persons visited the Exhibition, which comprised Australian animals, birds, fishes, shells, insects, trees (woods) and flowers, paintings, photographs, and interesting faunal and botanical records. The incidental expenses of attendants, printing, etc., were borne by this Society, the Celebrations Council regretting its inability to subsidise the function beyond providing the facilities above mentioned.

GRASSHOPPER PLAGUE.

Council members have taken great interest in the question as to whether the method of combating the grasshopper plague by the use of poison baits had the effect of destroying native birds. The arguments and assertions of field observers were fully considered, and Council had the advantage of the special knowledge of one of its members, Mr. W. B. Gurney, Government Entomologist. While the question has not yet been definitely settled to the satisfaction of this Society, it is considered that full investigation of all features is being carried out by the Department of Agriculture and the Council for Scientific and Industrial Research.

FAUNAL RESERVES.

This Society called a meeting of representatives of all the other scientific bodies of New South Wales to discuss the status of many of our rarer animals and means of preservation. It was unanimously decided to press the formation of faunal reserves for the isolation and breeding of native animals now under threat of extinction. The National Park Trust has been approached and has undertaken the establishment and upkeep of the first of, we hope, many faunal reserves. This question was referred to and adopted by the Faunal Conference (see next paragraph).

FAUNA CONFERENCE.

At the request of the Honourable Frank Chaffey, M.L.A., Chief Secretary, this Society was represented at a Conference on Fauna Preservation by Mr. Tom Iredale, President. The Conference was held in the Executive Council Chamber, Sydney, on the 14th, 15th and 16th September, 1937. Representatives of government departments and other scientific societies of New South Wales, Victoria, South Australia and Tasmania attended. Mr. Chaffey presided, and the recommendations of the Conference were summarized, the following being those principally bearing upon the aims and objects of this Society :

1. That the principle of the urgent necessity for the formation of faunal reserves for the preservation and breeding of native animals be adopted—each particular State and the various organizations concerned to work out ways and means of giving effect to the principle.
2. That special efforts should continue to be made to conserve the koala, platypus, lyre bird and the marsupial wolf of Tasmania ; also, that the following additions be made to that list :
 - Brush turkey.
 - Mallee fowl.
 - Jungle fowl.
 - Australian bustard.
 - Echidna.
3. That with a view to the preservation of the koala action be taken in each State to discover and set aside suitable areas of land with food trees suitable to the koala—these reserves to be then managed as koala stock farms ; also that a Koala Committee be constituted to advise the authorities in each State.
4. That a Fauna and Flora Board be constituted in each State of the Commonwealth not already possessing same. These boards to act in an advisory capacity to the government departments concerned.

DIAMOND JUBILEE.

In March, 1939, the Society will have completed sixty years of activity, and steps will be taken fittingly to celebrate the occasion. Members have been asked to make special efforts to nominate new members in the hope that the coming year will see the full complement of 350 enrolled.

Mr. Phillip Shipway presented the Balance Sheet (see p. 5).

In moving the adoption of the Report and Balance Sheet, Mr. Percy Spender, M.P., said it was a pleasure to have the privilege of moving the adoption of the annual report. He congratulated the Society upon a successful

year and its stable financial position. It was always a pleasure to him to be associated with any society which had as its object scientific research. As a young country, Australia, for years past, had not given proper support to scientific men in the work they were doing for the community. Science went hand in hand with agricultural and industrial development.

The Society was to be congratulated on the contribution it was making to public knowledge on important matters. Organizations like theirs should be fostered, and finally the government would do the right thing and give practical support. He noticed by the report that they discouraged associate members who sought to trade in birds. They were to be congratulated for adopting this attitude. Some time ago they had given a definite opinion on the importation of certain birds from overseas, unless these were proved to have economic worth and not harmful to anything here. Another matter he hoped would have their attention was the export of birds. He believed the government had given permits. If these exports were for scientific purposes then all was well, but if they were for commercial uses such exports should be prohibited.

Mr. Aubrey Halloran seconded the motion.

Col. Alfred Spain, Chairman of Taronga Park Trust, moved a vote of thanks to the speakers, and referred to the admirable judgment of the Society in selecting such a beautiful day in which to view the attractions of the Park.

The following members of Council, retiring under Article 23, were re-elected : Messrs. N. W. Cayley, A. Halloran, A. F. B. Hull, C. F. Laseron, Dr. F. Marshall, Mr. G. P. Whitley.

At a meeting of Council held on 27th July, 1938, the following were elected officers for the year 1938-9 : President, A. F. Basset Hull ; Vice-Presidents, Neville W. Cayley, T. C. Roughley, Drs. Garnet Halloran and Frank Marshall ; Hon. Secretary, Tom Iredale ; Hon. Treasurer, Phillip Shipway ; Hon. Librarian, A. S. Le Souef ; Hon. Editor, A. F. Basset Hull ; Hon. Assistant Secretary, Miss B. French ; Hon. Auditor, R. J. Stiffe.

BALANCE SHEET AS AT 30th JUNE, 1938.

ACCUMULATED FUNDS.						ASSETS.					
			£	s.	d.				£	s.	d.
GENERAL ACCOUNT—						GENERAL ACCOUNT					
WORKING AC-						INVESTMENTS—					
COUNT—						Office and Lecture					
Balance at 30th						Room Furniture					
June, 1937 ..						and Equipment					
Add Excess of						(at valuation,					
Income over						plus additions)					
Expenditure						Library Books,					
for the Year						etc. (at valua-					
						tion)					
						500 0 0					
						714 7 10					
Less Purchase of						HANDBOOK FUND					
Furniture and						ACCOUNT IN-					
Equipment						VESTMENTS—					
during the						Australian Consoli-					
Year ..						dated Inscribed					
						Stock (Face					
						Value) ..					
						660 0 0					
Overdrawn ..						Australian Consoli-					
						dated Treasury					
						Bonds (Face					
						Value) ..					
Funds Invested						1,250 0 0					
						Metropolitan					
						Water Board					
						Inscribed Stock					
						(Face Value) ..					
						100 0 0					
						2,010 0 0					
HANDBOOK FUND						Including—					
ACCOUNT—						Albert Little-					
WORKING AC-						john Endow-					
COUNT—						ment ..					
Excess of In-						100 0 0					
come over Ex-						Hume Barbour					
penditure for						Endowment					
the Year ..						106 0 0					
Less Debit Bal-						Walter and E.					
ance at 30th						Hall Endow-					
June, 1937 ..						ment ..					
						175 0 0					
						CASH AT BANK AND					
						ON HAND—					
						Commonwealth					
						Savings Bank—					
						General Account					
						69 9 0					
						Handbook Fund					
						Account ..					
						10 14 1					
						Commonwealth					
						Bank ..					
						0 0 3					
						Cash on Hand ..					
						1 0 0					
						81 3 4					
						£2,805 11 2					
						£2,805 11 2					

Auditor's Report to the Members of the Royal Zoological Society of New South Wales.

I hereby report that I have audited the books and accounts of the Royal Zoological Society of New South Wales for the year ended 30th June, 1938, and have obtained all the information and explanations I have required, and in my opinion, the above Balance Sheet exhibits a true and correct view of the state of the Society's affairs as at 30th June, 1938, according to the best of my information and the explanations given to me and as shown by the books of the Society.

I have examined the register of members and other records which the Society is required to keep by law or by its Articles, and am of opinion that such records have been properly kept.

(Sgd.) TOM IREDALE,
President.

(Sgd.) ROBT. J. STIFFE, F.C.A. (Aust.),
Hon. Auditor.

(Sgd.) NEVILLE CAYLEY,
Vice-President

(Sgd.) PHILLIP SHIPWAY,
Hon. Treasurer.

Sydney, 18th July, 1938.

GENERAL ACCOUNT.

HANDBOOK FUND ACCOUNT.

6

Presidential Address

AUSTRALIAN AVIFAUNAL PROBLEMS.

By TOM IREDALE.

When I selected this title I had in view a very different address from the one that will now be delivered. I prepared a synopsis with headings Economic Research, Pure Research, Systematic Research, and Distribution. I then developed sub-headings, and elaborating these I found that the solutions to all the problems tended to revolve about a centre. Investigating further I became aware that this solution had been advocated by many of my predecessors during the twenty-one years since our separation from the Zoological Gardens Trust. It then appeared necessary to subordinate all the less problems into the emphatic re-advocacy of this solution. First, the major problems may be briefly outlined, and the matters that have come before the Council of this Society during my tenure of office will serve as examples.

We may start with the matter of poisoning adopted in the combating of the grasshopper plague which has been mentioned in the Annual Report. Our members have written in complaining of our inaction in not stopping this cruel method, or at least protesting publicly against it, as regards the unnecessary destruction of bird-life. Every view has been discussed and attempts have been made to secure data confirming this alleged great destruction of bird-life. It may be here stated that this Society is in favour of every method of bird preservation and against bird destruction for any reason unless *proved* absolutely necessary. This is where our legal element serves its purpose, as all evidence is sifted so that only the truth remains. In the case under consideration, although there was hearsay account of terrific bird destruction, no real evidence could be procured. On the other hand we had the real evidence that the methods employed were proving beneficial in the prevention of the extension of the plague. Here we see the great problem of the unwise disturbance of the wonderful balance of nature, as before our bird fauna was ruthlessly affected in the cause of the advancement of civilization the grasshoppers were naturally kept under control. A side issue may be here interpolated. A small native marsupial has been found to live on grasshoppers and may have played its part in the past, but now the little animal itself is almost extinct.

A further instance of the results of careless destruction of bird-life proving a curse rather than the blessing it was intended to be is that of the crow. This bird was (rightly) blamed for the destruction of a few lambs, and hence sheep breeders decreed its extermination, and, to their loss, in many places succeeded. Then arose a plague, the blow-fly, which is estimated to cost the country a million and a half of money each year. It is known that crows kept the blow-fly under control, and it would be a neat mathematica l problem to calculate how many crows would be needed to destroy a million and a half pounds worth of lamb each year. Yet today it is still difficult to convince the sheep breeder that a crow is not his enemy, but his friend. It is never realized that even a crow must live from year to year in order to be able to attack lambs at the lambing period only. All the rest of the year the crow is working for the good of the farmer.

Recently a vendetta was declared on hawks because some homing pigeon owners declared that these birds were killing all their pigeons during their races. Now there are few hawks capable of attacking such fast fliers as pigeons, and obviously there was some other reason for the loss of the majority of the pigeons. Nevertheless any bird that looked like a hawk was shot on this paltry excuse, some of the poor victims being harmless and useful birds

which might have lost in a fight with a pigeon and which certainly would never have attacked such a bird even if they met with it on the ground. It is the duty of this Society to protest against such senseless slaughter, but more authority is needed for success.

Two other similar cases may be cited as showing similar unreasonableness and necessity for higher control. Every fresh-water fisherman will parade the misdeeds of the cormorant, and subscribe money for its elimination. When it is shown that the cormorant is more sinned against than sinning, it is curious to note that prejudice will still avail against reason. Research has in many cases absolutely proved the harmlessness, and also in other cases the usefulness of the cormorant, but this is negated by solitary instances of faulty judgment by the bird. It is quaint to examine the data advanced by the anti-cormorant fishermen in pursuit of their phantom enemy. It must be here emphasized that this is not an attack on fishermen, but a defence of the poor cormorant, as all the real evidence so far is in its favour. It will be admitted that under certain circumstances and in certain cases some cormorants may attack immature fish, but these cases are so few, as against the good the bird does, that in reality cormorants should be protected, not destroyed.

The last instance is that of the rice-eating ducks of the Irrigation Area. Complaint was made that the ducks were eating all the rice, and permission was desired to kill them. It is well known that ducks cannot digest rice, so would be unlikely to do any damage; an inquiry was made, and it was found that the ducks were innocent and that bald coots were really doing a lot of damage. Thus it was necessary to negative any plea for permission to destroy ducks, but it would be granted for the control of the bald coots. A very injured innocent then explained "that was no good; you can't eat bald coots".

The preceding will give some idea of the problems that we are confronted with, and now the solution so often propounded by this Society is advanced once more with the hope that insistence will in time effect our object. This solution is the foundation of an Official Bureau of Biological Survey, which will treat every one of these problems scientifically and without prejudice, but with due care to the rights of the human being, and give the considered judgment which must have the effect of law. This bureau would comprise trained officers in every branch of science, workers in laboratories and workers outdoors. Data would be compiled from every angle so that the results would be incontrovertible. Thus the feeding habits of the crow day by day, year by year, in different parts of the country, would be investigated, and the amount of good done on the majority of the days counterbalanced by any harm done, so that the man on the land could see fairly and easily exactly what the crow meant to him for good or evil. It is possible that in some places the evil might overbalance the good, and then means of control would be advised, not necessarily destruction. This last is very important, as only in very rare instances would the extreme penalty become necessary. While carrying out these economic researches many forms of pure research would become important, and these would need consideration. At present there is a vogue for the study of bird psychology, and while this may seem carrying the idea too far to some of us of the older school, it is always unwise to decry the advanced methods of the younger students. Consequently if this be considered of value in the solution of any avian problem, let it be carried out under the official sanction of a bureau so that the results could be of acceptable and not of arguable worth. Similarly in the older world with restricted spaces, closer settlement and fewer birds, it is now becoming customary to initiate a census of a certain bird form. By this means the exact status of the selected bird form is determined and that in connection with its value as harmful or useful decides completely the use to the community to which in some cases must be added its value as an object of beauty, attractive to the tourist or visitor. It is almost impossible in this continent to visualize the use of a census of any bird form, yet here again we can cite an exception, the lyre bird. Apparently it does no harm nor good, but should be protected absolutely on account of its unique beauty and attractiveness, especially as it is helpless as well as harmless.

As above noted, the feeding habits of every bird whose value is questioned should be worked out, a beginning having been made by a scanty research

on those of the quail and starling. This leads to the matter of introduced birds, of which the latest apparent pest is the bulbul. This introduction was allowed to get a strong foothold before its harmful qualities were recognized. Really it is possible that the good this bird does greatly counterbalances its bad points, and control rather than destruction should be advocated. In the case of the endemic white eye, this little bird gem should never be destroyed whatever apparent damage it may be doing, as it works for good almost three hundred and sixty days per year. A bureau would display all these facts with official authority.

Now just a few words on my own chosen field of research. Systematic work is the most despised and most thankless of all phases of investigation, yet is the most necessary. It is curious to see it depreciated by people who should be able to appreciate it, and it has always seemed to me to be envy, as it is the most difficult to carry out successfully. No one can read without learning letters first, and systematic work is the basis of all other kinds of research, and every piece of work is dependent on the accuracy of the systematist. It may be pointed out that there are nearly seven hundred different kinds of birds in Australia, of which say 680 are considered as harmless or useful, the odd 20 or so covering all those accused of injuring man's interests. Over the extent of this continent many of these birds vary slightly in coloration or size, and it may be also in habits, a matter which has not yet been studied. In this connection may it not also be the truth that birds considered injurious in one locality may be definitely useful and non-injurious in another. An official bureau would settle all such questions in time.

To conclude, I would emphasize the urgent need of such an official bureau, and ask for cooperation from all scientific workers in other branches as though I am here dealing only with bird problems, the bureau would cover all the animal kingdom and coincident problems from other branches. The formation of an official bureau is no novelty, as there are similar bureaux in existence in other countries, that of the United States being a striking example, so that there can be no argument as to the usefulness and success of the project.

Twenty-one years ago this object was first mooted by this Society, and it is hoped that before long a start will be made and that this Society will continue its advocacy until the end is achieved.

A NOTE ON THE MONARO DISTRICT.

Mr. Amos E. Williams reports that during this year he has been observing the animals in the Monaro district. He considers that the black possum is exceptionally scarce in the Kosciusko sanctuary. There are a few scrub wallabies, and the grey kangaroos are slowly increasing. The wallaroo is almost extinct, and the platypus is also decreasing in numbers. There are a few rock wallabies on the Snowy River below Jindabyne. Along Varney's Range, between the main Kosciusko road and the Snowy River, there are still a few koalas.

REPORTS OF SECTIONS.

AVICULTURAL SECTION.

Annual Report.

The average attendance was 18, with a maximum of 21 at the annual meeting, and a minimum of 15 at several of the monthly meetings.

During the year a number of interesting lectures were delivered by the following: Messrs. R. J. Murray, K. A. Hindwood, N. W. Cayley, T. Iredale and W. J. Wood.

Several other lectures were promised but unavoidably postponed, and on these occasions, as on two other nights set aside for that purpose, the meeting resolved itself into an informal discussion of aviary notes.

As a result of these nights members received a wealth of interesting information, and this year we have had quite a number of written aviary notes from members and also by exchange with the Avicultural Society of South Australia.

During the year only two applications for awards were received by the secretary, and these were referred to the proper channels, although one application was not proceeded with owing to the fact that there was a doubt as to the origin of one of the parent birds.

The other application was made by Mr. Steeles, Jnr., and was of exceptional avicultural interest.

During the year our annual show was held in Anthony Hordern & Sons' building, and in this respect the work of Mr. Leet and Mr. and Mrs. Browne and others who so ably helped them must be commented upon, as the show was a very great success indeed. A slight financial loss was made, but it must be remembered that no admission fee was charged, as the show was conducted for the sole purpose of encouraging study of aviculture, and was not run on a commercial basis.

A. I. ORMSBY,
Hon. Secretary.

Aviary Notes.

Red browed or Senegal waxbill. One pair of these little waxbills occupy an aviary fourteen feet by twelve feet, among other waxbills and finches, the aviary being thickly planted with bamboo, ribbon grass and trees.

The nest was discovered on the 6th of March, 1938, and is the most interesting that I have ever seen in an aviary. It was built at the base of a clump of ribbon grass on the ground, out in the open flight, and was entirely constructed of teased rope and feathers, about the size of a small coconut, perfectly round in shape. On top of this nest was built another nest of grass and feathers, rather open. The entrance to the main nest took some minutes to discover, eventually being found at the base of the nest, level with the ground, where a small tunnel about as round as a man's small finger ran back into the nest. The mouth of this tunnel was right on the ground, and the birds definitely had to lift it up to enter the nest.

Young ones were first heard in the nest on the 19th of March and appeared to be about seven or eight days old. The parent birds at this stage were particularly timid, and would not approach the nest while being watched. They are also very excitable, fanning their tails out wide and switching them from side to side, which is very pretty to watch.

Four young ones left the nest on the 2nd of April, and were fine, strong, and well feathered youngsters. The colour of the young birds is slaty grey underparts and head, the wings and tail being darker, almost a brown; the outside tail feathers are white, similar to the parent birds. They have a short black beak with a white gape. The food of these birds was the usual

millet and plain canary seed, with a plentiful supply of fresh summer grass seed daily, also a good helping of white ants once daily, of which the birds consume a large quantity.

It may be of interest to mention here that the day after the young ones left the nest two of them discovered the water fountain and promptly decided to have their first bath, which I think is rather remarkable for young birds one day out of the nest.

ERIC C. STEELES.

[NOTE.—The Avicultural Section has recommended that an award be granted to Mr. Steeles for the above achievement.]

Cuban finches. These birds became very active towards the end of December, the male frequently carrying grass, but they did not seem to settle down. They were then supplied with a quantity of teased rope of short lengths, which were readily used, and a very good nest was built in the *Pittosporum* tree. The nest was entirely built of teased rope, there being no feathers used inside, but a large quantity were used on the outside of the nest.

Eventually three young ones left the nest in beautiful condition, and one was almost identical with the hen bird both in size and colour. A plentiful supply of seeding grass was readily taken by the parent birds, also a large quantity of white ants were consumed, and a piece of apple supplied daily, of which they are rather fond.

ERIC C. STEELES.

Mr. G. Dummett reports :

Blue faced parrot finches. This year I successfully reared three blue faced parrot finches. The birds were fed on millet, plain canary seed, with extras in the way of seeding grasses (mainly summer grass) and a few meal worms daily.

The young on leaving the nest were a dull green, with just a faint trace of red above the tail, and bright yellow beaks. They had coloured nodules on the beak the same as young gouldians. They also had two tufts of downy feathers sticking straight up above the eyes. The old birds were very shy when feeding the young, making no attempt to feed while being watched.

The nest was built in the shelter shed, and well out of view.

Ruddy or fire finches. I also successfully reared one African ruddy finch. When this bird left the nest it was plain brown, like the mother bird, excepting that it had a small piece of white flesh on either side of its beak. It was very strong on the wing and perfectly feathered. During the time the parent birds were nesting they had millet, plain canary seed, seeding grasses, small meal worms, and occasionally white ants. At three months small patches of red were noticed coming through the brown, and at four months the bird was a perfectly coloured cock, being a vivid red with two small gold rings around the eyes.

I noticed that during the time the parents were nesting they showed a definite preference for white feathers with which to line their nest. While the young bird was dependent on its parents, he was jealously guarded and well cared for, the parents driving off other birds.

The nest was built inside the shelter shed and very close to the roof.

Cordon bleus. The three cordon bleus that I reared left the nest prematurely—one bird being fairly strong on the wing although not properly feathered, and the other two remained on the floor of the aviary for four days—these two being barely half feathered. The colours of the young birds on leaving the nest were : wings and breast pale grey, head and sides of body very pale blue. At four months two cock birds showed red patches around the ears and the body colour took on a brighter shade of blue. The hen was a smaller and duller edition of the mother.

The nest was built very high in ti-tree within the shelter shed. During the time these birds were in the nest I kept the aviary well supplied with white ants and noticed that the hen cordon bleu ate greedily of these. Two or three days before the young cordons flew, being temporarily without white ants, I kept the aviary supplied with large quantities of leaf mould from the garden. The cordons were noticed to be turning it over searching for any small spiders or other insects which it contained.

In addition to white ants and garden insects the birds had access to millet, plain canary seed, seeding grass and small meal worms.

Green strawberries. This year I was again successful in rearing one young green strawberry finch from the pair of birds which last year reared three young ones. The parent birds nested in the open flight of the aviary, building a large grass nest in the privet hedge.

The young strawberry on leaving the nest was unlike the adult birds, being entirely grey with a yellow patch on the wings and a dull black beak. At four months old it started to assume adult colours—black and white bars appearing on the sides of the body and rich olive green on the breast and rump. The parent birds were kept well supplied with white ants and small meal worms, and when white ants were not available large quantities of leaf mould, and the usual supply of millet, plain canary seed and seeding grasses were also available.

Mr. R. B. Browne reports :

Red faced parrot finches. Received three birds on December 4, 1937, apparently two cocks and one hen. Ti-tree was supplied, fastened to the wall of the aviary, and a ready-made straw nest hidden in it.

The birds started building immediately in the nest provided, extending the front forward and inwards to the centre, making a smaller opening of about 1½ inches diameter, and lining the inside with feathers.

Food supplied consisted of millet (panicum), plain canary seed, meal worms, dried flies and crushed hemp, with plenty of seeding grasses. The crushed hemp was readily eaten, and the insects also, but not so ravenously, and it did not seem that the insects were essential.

The hen started sitting on December 26, and did all the incubating.

On January 12 some young ones were found in the nest, and may have been hatched a few days earlier. The same food was continued, and four young ones left the nest in perfect condition on February 2, and are still doing well.

On February 12 the hen laid again in the same old nest, although another one was available. The original nest was thoroughly cleaned out by the birds and some more feathers added to the inside. On February 14 there were three eggs in the nest, one being laid on each of the three successive days.

A peculiar feature of the young is that two of the four have a great deal more brownish-red colour about the head than the other two, and have been ringed accordingly to denote what is probably the distinction of the sexes.

Also the four young have two extremely luminous beads on the bill, one above and one below the opening at the base, similar in appearance to those of gouldians, excepting that they are brighter and only two in number.

The upper bill is black and the lower one yellow. The whole body colour is green, but of a much duller shade than the adults, with a small patch of pinkish yellow on the throat. The supposed cock birds have a brownish red patch on top of the head, which is lacking in the other two, and the latter may be a trifle smaller in size, both in head and body.

BUDGERIGAR SECTION.

Annual Report.

The domestic activities of the Section have been a departure from those of any previous year. The holding of "table shows" each alternate month met with a ready response and augurs well for their success and continuance during 1938-9. The interest was well sustained and from many aspects an education to old and new fanciers alike.

The amateur judging competitions conducted in conjunction with the shows were equally successful, and members showed throughout the series a keenness in their selections and uniformity of opinion not anticipated when this competition was added to each show. In twenty-one separate judging events the margin separating the first six placings was only 14 points, aggregate 90 points. The winner of this competition was Mrs. R. B. Browne. The syllabus as laid down for the coming year is more comprehensive, and should prove of considerable interest to all budgerigar fanciers.

During the year a Centenary Exhibition was held at Anthony Hordern & Sons Ltd., Sydney, in cooperation with the Avicultural Section. This exhibition was held for the purpose of bringing before the general public the work of the aviculturist in such a way as to impress and foster in their minds the love of our feathered friends.

The coveted *Sydney Mail* trophy was won by Mr. J. Catt with a bird of wonderful coloration—a yellow-wing laurel. In the winning of this trophy Mr. Catt is justly envied—nevertheless heartily congratulated.

Without being seemingly discourteous to the members of this Section who worked for the success of the exhibition, special mention I feel is due to Mr. G. Leet and Mr. and Mrs. R. B. Browne. To these members the success of the organization of the exhibition is due. The Section's thanks is passed to these members.

We are also not unmindful of the generosity of our lecturers, Mr. N. Cayley, Dr. Garnet Halloran and Mr. T. Iredale, who gave to us most interesting and instructive discourses.

The attendances at the monthly meetings have shown a steady improvement during the year, and the introduction of new members has been in keeping with the previous years.

In reviewing the standing of the budgerigar generally in its relation to other fancies I see no reason to be pessimistic as to its future. I will agree that for the past two years the budgerigar has been in a transitionary stage, from its years of plenty, financially, to its state of general popularity. The result leaves no doubt as to its future standing. The drawback of exhibiting bodies!

The budgerigar today is without doubt the most popular of all cage birds. The colour mutations are a source of wonder to the uninitiated and a plaything in the hands of the experienced breeder. For this popularity no small measure of credit must be given to members of this Section for their activities in outside circles.

In conclusion I might add that the maintaining of this Section within the Royal Zoological Society is necessary as being the foundation on which the successful continuance of the popularity of the budgerigar is built.

FRANK BRENNAN,
Hon. Secretary

MARINE ZOOLOGICAL SECTION.

Annual Report.

Your Committee has pleasure in submitting its report for 1937-38.

Attendance at meetings has been smaller than we could have wished, but members have attended regularly and a number have become keen collectors.

Interesting illustrated lectures have been given as under :

1937—

September 6 : "Taronga Aquarium", by Mr. Chas. Camp.

October 5 : "The Lure of the Loricata", by Mr. A. F. Basset Hull.

December 6 : "Ancient Seas of Australia", by Mr. C. F. Laseron.

1938—

March 7 : "Destruction of Timber by Marine Borers and Other Pests", by Mr. R. A. Johnson.

April 4 : "Travels Abroad", by Mr. G. P. Whitley.

May 2 : "Australian Naturalists of the Past", by Mr. Tom Iredale.

June 6 : "Shells and Shell Collecting", by Mr. C. F. Laseron.

July 5 : Marine Exhibits by members.

August 3 : Early Books on Conchology, by Mr. Tom Iredale.

November 1 : Informal Conversazione and Exhibition of his collection of New South Wales shells by Mr. C. F. Laseron.

February 7 : Marine Exhibits by members.

Exhibit evenings have been a feature of the year's programme :

An excursion to Long Reef, Collaroy, in November, was poorly attended but interesting collections were made.

Several of our members displayed collections at the Flora and Fauna Exhibition during the sesqui-centenary celebrations, and our enterprising President, Mr. C. F. Laseron, by interchanging stamps for shells with the school children of Woolgoolga, North Coast, has discovered new species and considerably added to his already fine collection.

In conclusion, your Committee wishes to thank all those who have, in any way, contributed to the success of the year's work. What we have lacked in numbers has been partly compensated for by the enthusiasm of our members. May we hope that the ensuing year will see our numbers increased and our interest and enthusiasm sustained.

C. F. LASERON,
Chairman.

MAISIE M. GOLDING,
Hon. Secretary.

ORNITHOLOGICAL SECTION.

Annual Report.

In presenting the annual report of the Ornithological Section, it is gratifying to note that the attendance of members has increased to an average for each meeting of 38, as against 34 in the preceding twelve months.

Lectures were held at each of the monthly meetings, all of which proved most interesting and instructive to members. A wide range of subjects was covered by the lectures, showing the immense field to be embraced by the student of ornithology.

The following is a complete list of the lectures and lecturers :

1937—

- July 16 : " Birds of Tasmania ", by M. S. R. Sharland.
- August 20 : " Bird Books ", by K. A. Hindwood.
- September 17 : " The Kimberleys ", by C. Price Conigrave.
- October 15 : " Gould League Camp-out ", by members.
- November 19 : " Minds of Birds ", by N. L. Roberts.
- December 17 : " A Bush Ramble ", by N. Chaffer.

1938—

- January 21 : " A Trip to Central Australia ", by H. O. Fletcher.
- February 18 : " Travels Abroad ", by Gilbert Whitley.
- March 18 : " Sound Films ", by S. Stubbs.
- April 22 : " Economic Ornithology ", by K. C. McKeown.
- May 20 : " Colour in Birds ", by Roy P. Cooper.
- June 17 : " Some Bird Problems ", by Tom Iredale.

The birds of four States, namely New South Wales, Tasmania, north-West Australia and Central Australia, were covered by the lectures of Messrs. Chaffer, Sharland, Conigrave and Fletcher, respectively, while the Gould League Camp-out discussion by members enlarged on the birds of the Riverina. Mr. Whitley gave interesting details of the skins of extinct birds that were in the overseas museums, and Mr. Hindwood's lecture on " Bird Books " brought many irregularities to light besides showing the amount of small and large books written on birds.

The work carried out in economic ornithology by Mr. McKeown was well summarized in his lecture on the subject. Experiments conducted with poisoned wheat showed that sparrows after eating same immediately flew off at a great speed, in some cases a distance of a mile, before dropping dead. Very seldom death occurred on the actual field.

Messrs. Roberts and Cooper broached new subjects for the Section in their lectures on the " Minds of Birds " and " Colour in Birds " respectively. Mr. Roberts drew attention to the unbridgeable gulf that exists between the outlook of birds and the outlook of men. Mr. Cooper projected microscopic lantern slides showing how the various colours appear in the vane of a bird's feather, and also discussed the theories of natural and sexual selection.

The movie films shown by Mr. Stubbs of the " Lyrebird " and " The Nepean " were excellently compiled, while Mr. Iredale's address as chairman dealt with many of the problems that confront the student of ornithology.

The photographs shown on slides throughout the series of lectures have been of the same standard as previously, and undoubtedly must favourably compare with any similar group throughout the world.

During September a conference called by the N.S.W. Chief Secretary was held, and Mr. Neville W. Cayley, from this Section, was appointed as representative for the Royal Australasian Ornithologists' Union, and Mr. Tom Iredale as representative of the Society.

A resolution adopted at this conference requested the R.A.O.U. to forward details of birds for which complete protection was desired for the whole of Australia. This work is being carried out by R.A.O.U. members of the Society, and lists showing the discrepancies between the State Acts are being compiled. It is hoped that when the final report is forwarded to the Chief Secretary extra protection will be granted to a large number of birds.

A party of members visited the Gould League Camp-out at Leeton and "Kooba" Sheep Station in September, 1937. So great was the interest shown by the local authorities that a sub-branch of the R.A.O.U. was formed. Most of these members have since been appointed rangers, and they are proving very enterprising in their endeavours to form new sanctuaries and generally protect birds from destruction.

During the return journey two new bird records for the Mallee country at Barellan were noted by Mr. M. S. Sharland. These were the Gilbert whistler and shy ground wren.

The cabin, at the Waterfall end of National Park, has continued to be occupied regularly by members during the year. A report has been handed to the Council of the Society for submission to the National Park Trustees of the activities conducted at the cabin and elsewhere in the Park.

Notices have been sent to all members who desire them of the monthly meetings, and these have been largely instrumental in increasing the number present each month.

At the exhibition sponsored by the Society as part of the 150th Centenary Celebrations, the main exhibit was the framed photographs submitted by this Section. Several members also loaned additional photographs, in particular Mr. J. S. P. Ramsay.

A standing committee has been appointed by the R.A.O.U. to cooperate with the Council for Scientific and Industrial Research in all matters pertaining to ornithology, and Messrs. Iredale and Cooper, of this Section, have been elected as the N.S.W. representatives.

Observations have been carried out at a standard comparable with previous years, the most outstanding being the recording of an immature specimen of the white-tailed tropic bird by Mr. K. A. Hindwood from Bawley Point, South Coast. This is only the third record from Australia of this species.

The officers again wish to express their thanks to all members for their cooperation throughout the year, and also to thank the lecturers, who have made the year so successful.

ROY P. COOPER.
Hon. Secretary.

REPORT DEALING WITH THE SOCIETY'S RECENT ACTIVITIES IN NATIONAL PARK.

The attendance of members at the Zoologists' Cabin during the year has been well up to the average of previous years and interest in the natural history of the Park has been maintained. The convenience of the Cabin as a site for study in the field is appreciated by members, and much useful scientific work has been undertaken there.

One of our members during the year took a party of 40 or 50 nature students and bird-observers for a day's outing to the Cabin and lectured to them on the birds of the Park, after which the party was taken through the forest and shown some of the birds described. Further outings of a similar nature are being arranged.

The Cabin has been maintained in good condition, and some improvements have been made, both inside and out. Whenever possible, clearing of grass and shrubs from the sides of the Cabin is carried out, and the surroundings

are maintained in a tidy condition. Visitors from other countries are taken there to see birds, plants and other life which are not readily found in other places near Sydney. During the last two seasons the white cockatoo has been found nesting near the Cabin. The black-cheeked falcon has been photographed in the southern part of the Park, and bird-photographers have also given some attention to a pair of sea-eagles nesting at Marley.

Articles written from information gained from studies in the Park have appeared in various popular, and some scientific journals during the year.

The Society desires to draw attention to the position of the lyrebird in National Park. It is a matter that has caused some concern. For some five or six years past there is evidence that the bird in a wide radius of the Cabin has not reproduced its kind. Each winter during that period nests have been found, but in each case under observation it has been found that the eggs disappear before incubation is completed. This may be due to predatory animals, such as the native-cat or fox; on the other hand, egg-collectors may still be operating in the Park. Of the latter possibility, members have no definite knowledge, but they are watching the position in the hope of determining the real cause; and in this regard any help which the Park rangers are able to give would be appreciated. The lyrebird, as you doubtless know, normally builds one nest in a season and lays a single egg. When the nest is robbed, the season is often so far advanced as to preclude the possibility of the bird breeding successfully that year.

We also draw attention to the fact that the presence of road-workers' tents at the turn-off to the Cabin road has interfered with the satin bowerbird. For many years a bowerbird had a bower at this spot. We hope that when the tents are removed the scrub will recover and the bird will return. Being in such an accessible position this bower was one of the features exhibited to visitors from other States or abroad. Mr. Cherry Kearton, naturalist and photographer, found it most interesting, and he mentions it, as well as other attractions of the Park, in his book, "I Visit the Antipodes".

One of our members is now working in the Park on the life history of the satin bowerbird, with special attention to its bower-building habits.

Members have not confined their work to the area surrounding the Cabin, though here, it can be said, most of their study is undertaken. They have covered a wide area, and visited the coastal districts from time to time.

In the winter months there is a definite migration of honey-eating birds to the heathlands near the coast, and the gatherings of many hundreds of these bright birds, feeding on the banksias and other flowering shrubs at Gundamain and adjacent areas, singing loudly and clustering in the bushes, is regarded as one of the highlights of avian life in the Park.

We were gratified with the appointment of Mr. Neville Cayley as a member of the Trust during the year. Mr. Cayley is a Councillor of the Society, and his knowledge of ornithology should prove useful in this new sphere.

Mr. Cayley has proposed an extensive examination of marsh lands in the Park in search of the Bristle-bird, a bird which has not been recorded about Sydney for many years, but which may still inhabit some of these hitherto remote areas now rendered fairly accessible by means of roads. This examination is likely to be carried out during the year, with the Cabin as the base.

Among the "pets" which members have succeeded in taming, or at least inducing to come to the Cabin for food, are ringtail possums, bandicoots, birds of various kinds, and a large monitor lizard (goanna), the latter approaching fearlessly for food scraps, meat, etc. Notices have been posted in the Cabin asking visitors not to disturb the confidence of these animals.

Some members who recently visited Marley have reported that motor cars are being driven across the heath to that district. They understood that motor traffic to this spot was prohibited. In this area recently some native carvings were found—it is thought, for the first time.

Members appreciate various courtesies extended to them during the year by officers of the Trust on duty in the Park, and express the hope that the same cordial relations may continue.

SYLLABUS OF SECTIONAL MEETINGS, 1938-9.

AVICULTURAL SECTION (Second Monday in the Month, except when a Public Holiday. April 10 and June 12 are holidays)—

1938—

- July 11.—“Culture of Bees”, by W. A. Goodacre.
- August 8.—“Colour in Birds”, by Roy P. Cooper.
- September 12.—“Bird Parasites”, by K. A. Hindwood.
- October 10.—“Finches”, by Neville W. Cayley.
- November 14.—“Among the Birds”, by R. J. Murray.
- December 12.—Table Show.

1939—

- January 9.—“Lyre Birds”, by M. S. R. Sharland.
- February 13.—Subject to be selected, by Tom Iredale.
- March 13.—“Some Avicultural Problems”, by W. J. Wood.
- April 17.—“Are Birds Intelligent?”, by Noel L. Roberts.
- May 8.—“Antarctic and Sub-Antarctic Birds”, by H. O. Fletcher.
- June 19. Annual Meeting. Chairman's Address.

BUDGERIGAR SECTION (Third Tuesday in the Month)—

1938—

- July 19.—Table Show, Type only, any Variety. Lecture, “Sex-Linkage”, by W. Boardman.
- August 16.—Grey-wing Blue, any variety, normal and 50% body colour. Lecture, “Oysters”, by T. C. Roughley.
- September 20.—Yellow-wing Green, any variety. Lecture, “Fairy Wrens”, by Neville W. Cayley.
- October 18.—White-wing Blue, any variety. Lecture, “Early Ornithologists”, by Tom Iredale.
- November 15.—Any Variety not classified in Standard of Perfection. Lecture, “A Naturalist in Tropic Isles”, by G. P. Whitley.
- December 20.—Cinnamon-wings, any variety. Lecture, “Rambles in Bird-Land”, by K. A. Hindwood.

1939—

- January 17.—Young birds, any variety, close ringed 1938.
- February 21.—Members' Night. Lecturers for this and the following months will be notified to members in attendance at monthly meetings.
- March 21.—Table Show. Green, any variety.
- April 19.—Blue, any variety.
- May 16.—Self-coloured varieties.
- June 20.—Annual Meeting. Grey-wing green, any variety, normal, and 50% body colour.

Table Shows are open to all financial members. Nomination fee 3d. per bird. Trophy for best bird in show. Amateur judging competition in conjunction with each show; award on completion of series to the member having the greatest aggregate of points compiled according to judges' placings.

MARINE ZOOLOGICAL SECTION (First Monday in the Month, except when a Public Holiday, then on Tuesday)—

1938—

- July 4.—“Lord Howe”, by H. J. Campbell.
- August 2 (Tuesday).—Exhibition Night.
- September 5.—“Seaweeds”, by Miss May.
- October 4 (Tuesday).—“Great Whales”, by David G. Stead.
- November 7
- December 5

1939—

- February 6
- March 6
- April 3
- May 1
- June 5.—Annual Meeting.

} Subjects to be selected.

ORNITHOLOGICAL SECTION (Third Friday in the Month)—

1938—

July 15.—General Discussion by Members.*

August 19.—“A Naturalist in New Guinea”, by C. Price Conigrave.

September 16.—“John Gould in Australia”, by K. A. Hindwood.

October 21.—“Honeyeaters of the Sydney District”, by several speakers.

November 18.—“Sea Birds of Sydney Harbour”, by Tom Iredale.

December 16.—“Fairy Wrens”, by Neville W. Cayley.

1939—

January 20.—General Discussion by Members.*

February 17.—“In the Gippsland Forest”, by D. Leithhead.

March 17.—“Colour Changes in Birds”, by Roy P. Cooper.

April 21.—“Avian Embryology”, by Dr. Garnet Halloran.

May 19.—“An Ornithologist Abroad”, by E. J. Bryce.

June 16.—Annual Meeting. Chairman's Address, by M. S. R. Sharland.

Meetings of all Sections are held in Room 6, Sixth Floor, Bull's Chambers,
28 Martin Place, Sydney, at 7.30 (for 8) p.m.

All members, associates, and their friends are welcome.

REVIEW.

“Australian Parrots: Their Habits in the Field and Aviary”, by Neville W. Cayley, F.R.Z.S. Angus & Robertson Ltd., Sydney, 1938. 12s. 6d.

Mr. Cayley adds another of his delightfully illustrated bird books to the list already standing to his credit. This work is devoted to that comparatively large group of gaily coloured Australian natives, the parrots, under which all-embracing title he deals with all the cockatoos, parrots, parrakeets, lorikeets and lorilets—a truly gorgeous family. Eleven coloured plates depict all the members of this group in all their marvellous variety of plumage, and even covering the recently evolved colour varieties of the budgerigar, pet of so many bird fanciers all the world over. Each species is described—male, female, and immature, where known; distribution (with map), habits and “aviary notes” on breeding in captivity. References in literature are freely quoted in extension of the author's own observation, and nineteen half-tone or line blocks are added, illustrating nests and nesting places, aviaries, etc. The work contains 324 pages of information, and a comprehensive index rounds off an altogether admirable example of what can be produced by an Australian author, printer, and publisher, the work being wholly set up and printed in Sydney.

A.F.B.H.

* These discussions are listed to enable members to take part in the proceedings, and to bring forward any problems for elucidation.

NOTES ON A PINK TONGUED SKINK
(*Hemisphæriodon gerrardii*).*

On October 14, 1937, I obtained two pink tongued skinks from Tweed River, near Murwillumbah, N.S.W. These were of a rather lighter build than the blue tongued lizard, also the tail was more slender, and equalled the length of head and body combined, was rounded, and of a semi-prehensile nature. The limbs slender, the digits rather long, and the two middle (third and fourth) digits of the hind limbs rather elongate. The head broad, with the neck well pronounced. The general coloration is drab or fawn, with blackish transverse bands commencing at the neck and terminating at the extreme end of the tail. One rather striking feature is that the rostral scutum is jet black, as are also the nasal scuta. The ventral surface is mottled fawn and black. The scalation is very smooth and flattened, the scales being without keels.

Tongue.—Pink and flat. When extruded it is vibrated very rapidly, after the manner of some snakes.

Eye.—Dark with a pale yellow, rather narrow, iris.

Ears.—Well defined circular depressions; some slight protection is afforded by one or two small scuta.

Food.—In captivity the principal food consists of snails, which are shelled and swallowed in much the same manner as by other skinks. This skink is a good climber, and I have seen it mount to the top of a fairly smooth post and wrench off snails which were adhering firmly to its surface. It will also eat raw meat, and occasionally small pieces of cooked meat. Also, it will sometimes drink a little milk, or raw egg and milk, but seems to prefer water.

It is fond of warmth, but is not a lover of very hot sunshine.

This skink, when being handled, clings very tenaciously, usually drawing blood from the back of my hands or wrists on account of the sharpness of its claws. This habit of clinging is possibly caused by nervousness.

One of these skinks, which was in poor condition when I received it, never properly recovered, and though I subjected it to artificial heat (the weather not being very warm at the time) it died on November 10, 1937. On December 27 following (morning) I noticed the female skink in the outer enclosure, sunbaking. When she saw me she opened her mouth wide, gave a loud hiss, and vanished into the sleeping compartment. Upon looking into the enclosure I saw a young one, and after a search I collected altogether seventeen of them. Some days afterwards I saw another juvenile in the garden outside the enclosure, it having apparently managed to get through the half-inch wire mesh. I made an attempt to capture it, but it escaped, and has, I am afraid, fallen a victim to a neighbour's cat, as it has not been seen since.

The young ones averaged four inches in length, of which the tail measured slightly more than two inches (average two and a quarter inches). They were boldly marked light fawn, with jet black transverse stripes. These stripes commenced on the neck and terminated at the end of the tail. I counted the black stripes on a number of specimens and they averaged twenty. There was also a black dot under each eye. The inside of the mouth was black, as was also the tongue, which was vibrated very rapidly. The muzzle (rostral scutum, etc.) is *not black* in the new born young. The pineal gland could be seen in these young. I placed these skinks in a separate vivarium with a glass top, with bark, leaves, etc., under which they could

* Identified by Mr. J. R. Kinghorn, of the Australian Museum, Sydney.

hide. For the first three days they did not feed, but drank a little water. I offered them finely chopped shelled snails, and after a while they commenced to feed. I then gradually added finely chopped raw meat or finely chopped cooked lamb to the menu, and they fed freely; also, they commenced to grow, sloughing at intervals, though this was extremely hard to follow as the slough was very fine.

January 29, 1938.—I placed the young ones in a larger vivarium with a glass front, fitted so that I could supply artificial heat for the winter.

February 19.—I measured several and found that they were now eight inches in length.

February 23.—I noticed a change in the colour of the inside of the mouth to pink and the tongue to a mauve colour. They were eating twelve large chopped shelled snails daily, also meat, and could shell small snails for themselves.

March 14.—Because of a considerable fall in temperature I supplied artificial heat to the skinks. They are all feeding freely, having had three small dishes full of meat and snails today.

March 16.—A warmer day, but night cool. Skinks still have artificial heat. The tongues of some of the larger ones are *distinctly pink* in colour. The black transverse stripes are much fainter in colour, though broader. One of these skinks broke its tail in half the day it was born (December 27, 1937). It is now reproducing it.

March 17.—Warmer, no artificial heat supplied.

March 19.—Fed young skinks on raw meat, also egg custard.

March 20.—Weather much warmer, but artificial heat supplied to skinks.

March 30.—Some of the skinks now measure nine and a quarter inches.

April 6.—One of the skinks measures ten and a quarter inches.

April 15.—Dull warm cloudy day, artificial heat discontinued.

April 17.—Quite hot day (87° F.), cold night. Artificial heat supplied to skinks at night.

April 18.—Bright and cold day, artificial heat supplied to skinks day and night.

April 20.—Young skinks feeding well on raw meat, under artificial heat.

April 22.—Weather becoming warmer.

April 23-24.—Weather becoming warmer, artificial heat discontinued.

April 25.—Colder day, artificial heat renewed.

April 26.—Cold day, westerly wind, artificial heat continued.

April 28.—Warmer day, artificial heat continued.

Measured two skinks. One measured ten and three-quarter inches, the other eleven inches.

May 13, 16, 24, 25.—Weather warmer, but heat supplied.

May 26.—Rained all day, artificial heat continued.

May 27.—Warmer day. Largest young skink measured twelve and three-quarter inches. Five months old.

After this followed several mild days and cold nights, when heat was supplied continuously to skinks.

June 17.—All skinks lively and healthy. Largest measured thirteen and three-quarter inches.

June 22.—Milder day, all seventeen skinks feeding well; artificial heat supplied continuously.

June 28.—Measured three of the largest young skinks. One measured twelve and a half inches, one thirteen and a half inches, and one fourteen inches. Skinks are now six months old.

June 28.—By now there is a marked change in the appearance of the skinks since they were born. The black spot under the eye, and at the angle of the jaw have disappeared. The ventral surface has changed from black to mauve, then salmon pink, and in some specimens to pale fawn colour. The black stripes have become broader, less bold, and in some have almost entirely

disappeared. The claws are sharp, and will now draw blood from the back of one's hand. The mouth is entirely pink, as is also the tongue. The black patch on the muzzle has now embraced the first labial on each side of the upper jaw, as well as the rostral and nasal scuta, also a black mark has appeared on the top of the head extending behind the eye to the base of the skull. The shape of this mark is as follows: < with the converging ends directed anteriorly.

They rarely now attempt to bite; this may be due to frequent attention.

At times these skinks show a rather unusual mode of progress, using the fore limbs only whilst the hind pair are held close and straight out against the tail.

During March, 1938, I witnessed the following rather amusing incident amongst these skinks: Some small live snails and slugs had been introduced into their vivarium, and the skinks commenced to feed. One of the larger reptiles had swallowed a slug, and was about to seize a second, when a slightly smaller skink picked up the slug in its jaws, upon seeing which the larger skink grabbed the fast disappearing slug by the tail end, and eventually both skinks' jaws met, when the larger one advanced its jaws over the front of the head of the smaller one and *bit hard*. There was some squirming and twisting before they broke free, whereupon the smaller skink regained his breath, then bit savagely at the nose of the other, also the neck, front foot, and finally the flank, after which affairs settled down to normal.

17 Bronte Street,
Bronte,
Sydney, N.S.W.

G. LONGLEY.



Young Pink-tongued Skink.

(Block by courtesy of "The Sydney Mail".)

SHELL COLLECTING IN NEW SOUTH WALES.

By C. F. LASERON.

Address given as Chairman of the Marine Section, June, 1938.

The collecting of shells is one of the oldest as well as one of the most fascinating branches of marine zoology. Shells as objects of interest have attracted the attention of people on the sea shore for untold years, and the most ancient books on natural history have numerous references to them. It is probable that much of the fascination is due to the fact that the depths of the sea have for ever been shrouded in an atmosphere of mystery. Even now, in a crowded city built by the sea, where nature has on the land receded far, the brink of the sea is the boundary of unexplored regions, and areas only a few feet away are as inaccessible as the centre of the Sahara, and much less known.

No wonder then that shells, with their infinite shape and beauty, have ever been objects of interest and speculation. Again they attract by the ease with which they can be preserved and kept. To collect them is indeed interesting, but infinitely more interesting is the realization that they are only the hard parts of living animals, animals of such diverse forms and habits that the life history of any one species is enough in itself to occupy the study of a specialist for a lifetime.

Thus some are vegetable feeders, others live on plankton, the minute life of the sea, some are carnivorous, others are straightout parasites on other marine animals. Some live in sand or mud, others are attached to rocks or seaweed, some crawl on the bottom of the sea, some swim on its surface, while still others are attached immovably to one spot throughout the greater part of their lives. Some are oviparous, in others the young are born complete with the embryonic shell, while others show considerable metamorphism between the young and the adult stages.

In considering shell collecting as a hobby, it is a fact that collectors collect to please themselves, nevertheless to obtain the maximum pleasure and results, it is well to work on some defined plan, and to limit activities to what is reasonably within accomplishment, and yet to put that limit sufficiently high that it is always just beyond the bounds of complete attainment. The idea of my own collection is to limit it to New South Wales, and the ultimate ambition to make the collection in itself a complete reference for all forms living within this area.

This limit has the advantage of being a fairly natural one, as it includes practically the whole of one faunal region, the Peronian region, so named by the late Charles Hedley. The northern limit of this region is in the vicinity of Brisbane, the southern the beginning of Bass Strait. Bass Strait is of only recent geological origin, and the fauna of southern Australia has hardly had time to spread far round the corner into New South Wales. Due south the limit is fairly well defined by temperature, possibly the greatest factor in preventing the migration of marine forms. Many Tasmanian forms do come northwards, having a tendency to seek deeper water as they do so, so that forms that are littoral in Tasmania are more often obtained in New South Wales by dredging than they are on the shore.

In the north the limit is not nearly so defined. Upon the continental shelf, which is a shallow ledge bordering the eastern Australian coast to an average width of about thirty miles, depths are generally shallow for some five miles to sea. The bottom is mostly rocky and weedy, and there is no natural barrier to prevent migration from the north. Moreover, owing to the warm tropical current which sweeps down the coast, the temperature of the water is nearly uniform, and there is little difference between that at Sydney and Brisbane, particularly at small depths below the surface.

Many shells have a free-swimming larval stage which may be for only an hour or so, but may last for several days. As the tropical current often attains a speed of four knots an hour or ninety-six knots a day, these species can easily be carried several hundred miles before they come to rest on the sea bottom. In southern Queensland the large shallow area of Moreton Bay, however, opening as it does to the north, acts something like a large trap, and to a certain extent limits the extension south of Queensland shore types. Nevertheless there is a large intermixture of tropical forms on the north coast of New South Wales, and as might be expected, these are often coral reef types which have come down outside Moreton Bay. Many of these are typical of even the outer coral reefs. The fact that the known list of these species is swelling day by day adds additional interest, as new discoveries can be made almost at any time.

Small coral reefs are quite abundant on the north coast of New South Wales, and worn pieces of coral are frequently washed up on the beaches, shells and other organisms associated with them. Mr. Mel. Ward, in his researches on the crustacea, has written extensively on this point. On a recent visit to Woolgoolga on the north coast, I saw a patch of living coral, and found specimens of *bêche-de-mer* alive under rocks at low tide. The southern limit of what might be called the tropical invasion is about Shell-harbour, and Sydney is well within its boundaries. Some years ago there was still living in Watson's Bay a large patch of reef-building coral, visible some distance below low water level, but I cannot say if it is there still. This corner of the harbour seems to catch the drift from the north, and at Bottle and Glass Rocks many tropical species have been found.

Another interesting point about the molluscan fauna of New South Wales, and indeed practically of the whole of southern Australia, is that it is a survival of a fossil fauna, and its affinities must be sought in past geological periods rather than with shells living in other parts of the world. There is indeed a greater resemblance between it and the Tertiary fossils of France and Italy than with those still living in the other oceans. The well-known genus of *Trigonia* was indeed familiar as a Mesozoic and Tertiary fossil before it was found living in the coastal waters of Tasmania and New South Wales.

Shells live everywhere in the sea, under all sorts of conditions. The littoral forms are fairly easily collected, those of slightly deeper water are often only obtainable by specimens washed on to the beaches, those in still deeper water must be procured by dredging. Sydney Harbour is a conchologist's paradise, though now somewhat spoilt by pollution, particularly in the vicinity of the main wharves.

According to location, several quite different faunas can be found. The mud forms, living between tide marks, constitute a large and variable fauna in themselves. In Middle Harbour, particularly, there are many little coves which are quite unspoilt, and at low tides good collecting is always possible. With the large "*Hercules Club*" whelk everybody is familiar, and these, with the smaller whelk *Lampania*, can be seen crawling on the flats well above low tide. The same applies to the still smaller whelks, the *Bittiums*, which burrow into the mud or beneath the protection of weeds. Not quite so conspicuous are the *Naticas*, or rather *Polinices*, which plough along just beneath the surface of the mud, leaving a characteristic track. These, by the way, are carnivorous, and in their journeying seek numerous small bivalves, which they literally engulf, and having absorbed the soft parts, disgorge the empty shell.

Even where no shells are apparent on the surface, a spade and a sieve reveal many bivalves alive, the white *Tellina*, the delicate *Cryptomya*, the Razor shell with its siphon exerted just above the surface, *Corbula* and many others. In the shallow pools, particularly if weeds are present, *Nassarius* crawls about, as well as other small gasteropods, and in fact quite a good collection can be made from this type of locality alone.

Just beyond low tide mark, among the weeds and the mud, live the large bivalves, *Paphia*, the common cockle, *Arca*, and with them the unequal valved *Pecten*, which unlike most other bivalves propels itself along by opening and shutting its valves. With them is associated a great variety of small or even minute shells, hard to detect alive, but more easily collected by examining the rills of minute dead shells left by the receding tide.

Passing from the flats to the rocky foreshores, it is wonderful how many limpets can be secured well above low tide mark. Counting the Siphonarias, which are really not true limpets at all, but air breathers more akin to the snails, some eight forms can be found in the one spot at the head of North Harbour. The star limpets live in deeper water well below low tide, and can only be reached at spring tides. They live, both inside and outside the Harbour, attached to the rocks between kelp roots, and with them is the large mutton fish or *Haliotis*. On the kelp itself, on the outer reefs, is the gaily painted *Phasianella*, which is worth getting alive, as then can be seen the white stony operculum, with which the aperture is closed.

On the rocks at about low tide are often large colonies of mussels, adhering by their hairy byssus. Among these live a whole host of creatures, with many shells, black *Mitras*, *Conus*, *Murex*, small bivalves and many small forms.

When we come to the small, semi-microscopic shells, their variety is enormous. The kelp and other seaweeds support a fauna quite their own, a fauna which indeed has never been thoroughly studied. To collect this it is necessary to immerse the seaweed in a bucket of fresh water, when the shells drop off. After washing a quantity, a small amount of detritus collects on the bottom of the bucket, and when this is dried and examined beneath a lens, it will be seen to be full of minute shells, some of surpassing beauty, and many unfortunately still unnamed. The beautifully sculptured *Liotias* are found here, as well as the *Rissoas*, the sinistrally coiled *Triphoras*, the delicate *Turbonillas*, the quaint *Zafras*, a minute species of *Phasianella*, and others too numerous to mention.

In the rock pools near low tide live the Turbos, *Astralius* and other gasteropods. Here are the *Trochidae* beneath stones, including some of the prettiest among the moderately small shells. In the shallow pools on the outer reef, if one is fortunate, a dainty *Bullina* may be seen crawling about, its delicate red-striped shell perched on the back of a pure white animal, with the edges of the foot outlined in the purest of blues. The curious leaf-like *Hydatina* is also a gaily coloured animal, and it lives in similar surroundings. Its curious and delicate striped shell is one of the most fascinating of our extensive fauna.

It is on the outer reefs, such as Long Reef, near Collaroy, that some of the most interesting collecting can be done. Here almost anything can be found, odd rare forms from the north, even a live cowry or two.

The cowries or *Cypræas* deserve a paragraph to themselves. They have ever been the most popular of shells, owing to their rich enamel and beautiful colouring. In all about thirty-five species live on the coast of New South Wales without counting the ridged cowries or *Trivias*, or the egg shells or *Ovulas*. They are mostly migrants from the north, but well acclimatized, and they live in that most difficult zone to reach, amongst rock cracks and crevices in fairly deep water. Sometimes they are washed on to the shore, but nearly always broken, or with the brilliant enamel scratched and the colour dulled. Fortunately, however, in mid-winter, odd specimens crawl up into the shallows, and may be taken alive beneath stones in the rock pools. Quite recently, at Long Reef, I procured three live specimens in the one day, and a fortnight later no less than nine. And again, working with a friend at the same locality, we obtained no less than thirty-five alive, belonging to ten species. These were taken in most cases in very shallow channels almost up to the high tide mark. This can be taken, however, as quite exceptional, due to some unknown condition, perhaps not recurring for years. It emphasizes the opportunism of collecting, and the necessity of making the most of circumstances as they arise. The farther north one goes, the commoner the cowries become, and on the extreme north coast they are quite abundant. At Woolgoolga, recently, under one small stone, there were no less than seven live examples of the ringed cowry, *Cypræa annulus*. In life, and when crawling about, the mantle entirely covers the shell, and it is the continuous secretion of enamel throughout maturity which gives the brilliance to the shell.

The beaches, both inside and outside the Harbour, again have quite a distinctive shell fauna. Most of the molluscs burrow in the sand just below low tide, and the dead shells are sometimes washed up in great numbers, particularly after a prolonged period of westerly winds. The ubiquitous "Pippi" (*Donax*), beloved of fishermen for bait, is perhaps the commonest.

The heavy shelled *Glycimeris* is also very common, as well as several species of *Mactra* and many small bivalves. Amongst the univalves the variably coloured *Cantharidus*, often made into necklaces, is perhaps the commonest, sometimes being so abundant as to give a distinct colour to patches of the beach.

On the beach itself attention must be paid to the lines and accumulations of shells left by the receding tide, mostly in the vicinity of the high tide mark. Here will be found many small forms, *Marginellas* and other univalves, difficult to procure alive, as they live in somewhat deeper water, and can only be washed ashore under favourable conditions. The curious little bottle-shaped pteropods, which swim on the surface of the open sea, can often be found in these situations, as well as the purple storm shells (*Ianthina*), which generally come ashore in the summer months with myriads of "Portuguese Men-o'-War". To collect the small forms it is well from time to time to take the samples of the shell sand for further sorting, when many small forms will be revealed well nigh impossible to detect on the beach itself. Amongst these a curious little white glassy univalve with a bent spire, rarely above an eighth of an inch in length, occurs fairly plentifully. This shell, *Melanella*, is interesting as one of the few examples of absolute parasites among shells. The host in this case is either a star fish or a sea urchin, and the shells live in cyst-like clusters in the arms of the star fish or the body of the sea urchin. There are evidently a number of species of *Melanella*, but little is known of their life history, nor whether each species of host has its own peculiar species of parasite.

Now for the deeper water forms, which are the most fascinating of all because they are the hardest to obtain. These may be divided into five groups, those which live in mud, those which live in sand, weed forms, reef forms, and finally the real deep water species which live far out on the continental shelf. All of these can only be secured by dredging, which means hard work and perhaps sea-sickness, many disappointments, but sometimes the greatest reward of all in the form of a rich haul.

Dredging methods differ, but they need be neither elaborate nor costly. In this Society I showed on a previous occasion a simple type of home-made dredge, which was described in last year's *Proceedings*. In depths up to twenty fathoms this has proved quite effective, which is sufficient for any part of Sydney Harbour, and for a mile or two off the land—quite a big enough field to cover.

Sydney Harbour is a good ground throughout. Contrary to expectations, the Harbour is really quite shallow, with a uniformly flat bottom free from rocks, and a depth of about seven to eight fathoms, except for a few deep holes up to nineteen fathoms. For the most part the bottom is weed covered, a fact which makes dredging somewhat difficult, as the light dredge tends to slip over the smooth surface of the weed without biting. This is unfortunate, as occasional operations of large bucket and suction dredges show that the weeds must harbour a tremendous number of molluscs as well as other creatures. In many cases, however, as in Athol Bight, the weed gives place to soft mud which at first sight contains nothing at all. On sifting, however, many things come to light, conspicuous among which is the little bivalve *Nucula*, with its beautiful nacreous interior. This is quite an interesting shell, similar to fossils found in the very early Palæozoic periods. It belongs to one of the earliest families of molluscs, and while exact comparison with fossil forms is very difficult, there can be no doubt as to its general affinity.

Here as elsewhere in the deeper water live shells of the family Turridæ, also of ancient lineage, a group of univalves of extremely diverse form and often beautiful sculpture. They are characterized by a slit or indentation at the posterior end of the aperture. All the turrids are carnivores, but a great deal remains to be learned about their general habits, distribution and classification. Many genera and species are listed from New South Wales, but many new forms yet await descriptions and names.

Shallow water close to the rocky foreshores is a prolific hunting ground. Here many species live in water just too deep to permit them being washed on to the beaches. Some of our best hauls have been made in sandy patches between the weeds in depths of from twelve to twenty feet, only a few yards

from the shore. Here living *Ancillas* are quite common, as well as finely marked *Naticas*, distinguishable by their stony opercula from the *Polinices* of the mud flats.

A good dredging ground is just outside Quarantine Bay, and here a long muddy strip between the weeds at a depth of six to eight fathoms has yielded many specimens to the collection. A beautiful little *Cardium* never found on the beaches lives here in great profusion, as well as another bivalve *Cuspidaria*, generally considered as rare. As a matter of fact shells considered as rare are often quite abundant if their correct habitat is chanced upon, and instead of one or two worn specimens, the collection can be enriched by a fine series of specimens obtained alive.

Pittwater, an arm of Broken Bay, has also proved a prolific dredging ground, as yet on our part but partly exploited. Due west from Palm Beach an oyster bank runs north and south in the centre of the bay, with many species of other shells abundant, *Chlamys* and other bivalves attached to the oysters, with free moving types crawling between. In the sandy bottom adjacent we have found several species of *Marginella* alive, a common shell dead on the beaches, but a much more fascinating thing alive, much more beautiful and infinitely easier to separate into the numerous species. The animal of this shell, like *Nassarius* and other carnivores, is very active, and moves round rapidly in a jar of sea water.

Between Sydney Heads, in depths of from ten to fifteen fathoms, we come on the real sand forms. Dredging is easy, the dredge bites well, and comes up full time and time again, but much of the contents is pure sand, and generally after sifting but a small residue of shell, broken or otherwise, remains. The proportion of shell increases outwards through the Heads, but very calm seas are necessary to dredge this area from a rowing skiff. Here we find *Glycimeris* alive, often with *Calyptrea* attached, and here are the long slender *Turritellas*, often in great quantity, shells which it is well nigh impossible to obtain in good condition on the beaches. Here also are stragglers from the deeper water outside, and it is possible to obtain many forms originally recorded from depths of 50 to 100 fathoms off the coast.

Finally we come to the most difficult zone of all to collect, the reef forms which live in the ocean outside the shelter of the Harbour. Only on rare occasions of exceptionally calm weather are these grounds approached by seamen so poor as ourselves, working from an ordinary skiff, and then the difficulty is to find some spot free enough from reef to allow the dredge to bite. Right along the coast of New South Wales the bottom seems very rocky some miles from the shore, a fact which is the more tantalizing as it seems to harbour a fauna of its own, about which little is known. The deeper water outside is worked by the trawlers, which have brought much to light, and dredgings have been made by properly equipped deep-sea vessels like the *Challenger*, *Thetis* and others, but this particular zone, from depths of eight to twenty fathoms, has been but little explored.

Our one good haul to date was rather remarkable. This was in fourteen fathoms, off Collaroy, and the whole expedition one Sunday afternoon occupied only about two hours. Guided by a fisherman in his launch to a gravelly spot between the reefs, we succeeded in obtaining about half a sugar bag of siftings, which so far have yielded some 250 species, of which about 50 are new to science. This is to form the subject of a paper by Mr. T. Iredale, to be published at some future date. One tantalizing find, which emphasizes the possibilities of this zone, was a fragment, the anterior canal of a large frilled *Murex*, utterly unlike anything known on our coast, and if complete, probably one of the most beautiful of all our shells. One wonders when a complete specimen will come to light.

So much for collecting. In the previous pages are barely outlined the possibilities of the eastern coast of Australia, New South Wales in particular. When the late Charles Hedley published his check list in 1918, some 1,200 species were enumerated. Since then, possibly 500 have been added, partly by the revision of groups, but more largely from deep-sea specimens brought in by the trawlers. Possibly when all are known the list will be nearer 3,000, a tremendous variety for one faunal region. In the collection made by myself and my son John, excluding many passed over to the Australian Museum, are at present about 900 species, and this must be considered as

fairly representative, as we have not touched the nudibranchs or any of the shell-less forms, any cephalopods or loricates (chitons). It is fortunate, however, from our own point of view, that it is still far from complete, and there are still many finds to make.

Finally about the care of the collection. This is largely a matter of personal taste, but there are several essentials for all collections if they are to have any permanent scientific value. Firstly it is wise to keep all specimens of the same species from one locality in the one box or container, which, whether a glass-topped box or otherwise, should be of such a form as to prevent spilling and mixing with those from a different place. Everything should be properly labelled and memory never depended upon, as with the best of intentions this is most unreliable when most important. Our own method is to keep the individual species identified as far as possible, but with the locality always, and a register of species to check what is lacking. The specimens are kept in cabinets, classified in families to facilitate study. The semi-microscopic specimens present the greatest difficulty, and this we think we have solved by making containers ourselves of a form which lend themselves to quick handling, visibility, and which are easy to manipulate for microscopic examination.

SHELL-COLLECTING IN THE PORT MORESBY DISTRICT OF PAPUA.

By ROLAND V. OLDHAM.

Having collected around the Port Moresby district for a number of years, I now submit this short list of the species that are to be found there, together with an outline of the most likely places to prove profitable to the collector who may venture into this region.

Of the land shells I shall not write, for the district is so dry for the greater part of the year that it is almost a useless task to search for this family. During my twelve years in this part I have only collected one specimen of land shell, and that a dead specimen, which may or may not have been brought there by human agency.

The harbour of Port Moresby is at first glance a rather doubtful ground, but the shores prove a rather surprising collecting ground.* Situated in the centre of the harbour is a fairly large reef, composed for the most part of coral boulders and large masses of soft coral. Although quite a likely looking spot, it yields but a few species of molluscs, of which *Conus mamoreus*, *Lambis lambis* and a small species of black-lip pearl are the most common. I have many times visited this reef, but have never yet collected a single species of the Cypræidæ, nor have I ever heard of anyone else doing so.

During the very low tides in May, 1937, I secured along the shores, in less than an hour, no fewer than eight species of Cypræa, all of which were much larger specimens than those that were collected on the outer reefs.

The cowries collected were: *Erronea caurica*, *E. erronea*, *E. sophiæ*, *Arabica arabica*, *Monetaria annulus*, *Staphylæa staphylæa*, *Mystaponda vitellus*, and *Lyncina vanelli*.

I have also at other times collected quite a number of *Calpurnus verrucosus*, *Erosaria erosa*, *Cypræa tigris* and *Ponda carneola*, together with a few Strombs, Mitras, Olives, Neritas, Patellas and many Cones. Altogether it is a remarkable region and well worth a visit.

Of the outer side, Ela Beach of course comes first, being situated close to the main part of the town. It consists of a wide sandy beach, sloping down to a long weed-covered flat that is submerged during high tide, which is in turn joined by a region of coral boulders and patches of dead corals.

The weed-covered flat is very prolific in cones, and thousands of the small variety of *Monetaria annulus*, which may, in fact, be raked up in bucketsful.

The western natives working in this district often come here to gather *M. annulus*, which they use as head bands and in the construction of a good number of articles and ornaments.

Minute shells are to be found in plenty under the boulders and coral, but I shall not go to the extent of listing all these, suffice it to say that they are to be found in plenty.

Now comes the chief hunting ground of the district, i.e. the main reef. I do not think there is any need to go into any extensive description of this part, for all know the wonderful amount of life there is to be found on a coral reef.

On the western side of the entrance to the harbour on the outer reef is a series of raised coral islands, the largest of which is known as Fisherman Island. The shore side of this island and also of the other islands close to it prove a very wonderful collecting ground, and although the outer side may prove very tempting, the inner will be found to yield the greater harvest.

In this region alone I have collected eighteen species of cones, twenty-one species of cowries, a number of Mitras, Strombs, Haliotis, Patella, Neritas and Bullas.

A number of years ago, while out on this reef with a friend, I saw the only specimens of *Cypræa testudinaria* and *Leporicypræa mappa* that I have ever seen in Papuan waters. Unfortunately for me, it was the good fortune of my friend to collect both specimens, and no amount of begging would induce him to part with them. They were eventually taken home to Austria, and are at the moment, I believe, in the museum at Vienna.

The specimen of *mappa* was the largest I have ever seen, being quite as large as a good specimen of *C. tigris*. Although I have searched that region many times since, I have never again come across these species, much as I should like to.

I have in my collection now one immature specimen of a black cowry, which has not yet been recorded. I live in hopes that it will fall to my lot to be able to find an adult specimen and thus be in a position to describe it.

The eastern side of the entrance is a region for the most part of sandy bottom, with scattered patches of living coral and weed. For cones and whelks it is quite a good ground, although one has to dive in order to do any collecting, for it is never laid bare by even the lowest tides.

Towards the entrance to Bootless Inlet and around the site of the "Pruth" wreck are large patches of staghorn coral, and although a good amount of searching has to be done to yield any results, varieties of shells are to be found, amongst which is the very small and beautiful cowry *Paulonaria fimbriata*, which has a bright red animal and is to be found adhering to the branches of the staghorn coral.

Very fine and clean specimens of *Conus textile* are also to be found here, although they are not so large as those from the sandy regions.

For the benefit of those who collect *Cypræidæ* I now attach a list of those that will be found in Port Moresby waters: *Erronea caurica*, *E. erronea*, *E. sophiæ*, *Arabica arabica*, *Cypræa tigris*, *C. testudinaria*, *Leporicypræa mappa*, *Erosaria erosa*, *Ponda carneola*, *Palmadusta clandestina*, *Calpurnus verrucosus*, *Monetaria annulus*, *M. moneta*, *Evenaria asellus*, *Trivirostra scabriuscula*, *Lyncina vanelli*, *Talparia talpa*, *Ravitronea caputserpentis*, *Basilitrona isabella*, *Staphylæa staphylæa*, *Mystaponda vitellus*, *Evenaria kieneri*, *Amphiperas ovum*, *Pustularia globulus* and the tiny *Paulonaria fimbriata*.

Although this is anything but a complete list, it may at least give the collector who is contemplating a trip to this part an idea as to what he may expect to find in the Port Moresby region, and at least save him the trouble that I myself encountered in having to look for the various spots in order to find where one may be able to collect the shells that most interest one.

REVIEW.

"Wild Nature in Australia", by Charles Barrett, C.M.Z.S. Robertson & Mullens Ltd., Melbourne, 1938. 2s. 6d.

This booklet contains 24 full page 4to reproductions of photographs of Australia's "Wonder Animals and Birds", together with a page of text in Mr. Barrett's well-known popular style, briefly outlining the manners and customs of the creatures illustrated. As a souvenir for visitors to carry abroad and show their friends, it is well suited in everything but the cost, which appears high in comparison with the author's delightful "Sun Nature" books, published at 6d. each. Nos. 9 and 10 of this series, recently published, are each of equal or even greater value than the "Wild Nature" book.

A.F.B.H.

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As on 15 August, 1938.

Note.—Unless otherwise specified, members are residents of the State of New South Wales.

Members will oblige by notifying the Honorary Secretary of any change of address.

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